Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
	°	°		°	°
West Gulf	+ 2.8	+ 0.7	New England	— 3.7	— 0.9
Ohio Valley and Tenn.	+ 2.0	+ 0.5	Middle Atlantic	— 2.0	— 0.5
Lower Lake	+ 2.0	+ 0.5	South Atlantic	— 2.2	— 0.6
Upper Lake	+ 9.8	+ 2.4	Florida Peninsula	— 9.7	— 2.4
North Dakota	+ 6.0	+ 1.5	East Gulf	— 4.8	— 1.2
Upper Mississippi	+12.7	+ 3.2			
Missouri Valley	+14.6	+ 3.6			
Northern Slope	+ 8.9	+ 2.2			
Middle Slope	+16.5	+ 4.1			
Abilene (southern Slope)	+10.0	+ 2.5			
Southern Plateau	+ 3.8	+ 1.0			
Middle Plateau	+ 4.9	+ 1.2			
Northern Plateau	+17.4	+ 4.4			
North Pacific	+ 0.9	+ 0.2			
Middle Pacific	+ 2.2	+ 0.6			
Southern Pacific	+ 4.5	+ 1.1			

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32°, and the limit of frost by the isotherm of minimum 40°.

MOISTURE.

The *quantity of moisture* in the atmosphere at any time may be expressed by the weight of the vapor coexisting with the air contained in a cubic foot of space, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The *rate of evaporation* from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporometer may be made to give the *quantity* of water evaporated from a similar surface during any interval of time. Such an evaporometer, therefore, would sum up or integrate the effects of those influences that determine the temperature as given by the wet bulb; from this quantity the *average humidity of the air* during any given interval of time may be deduced.

Measurements of evaporation within the thermometer shelters are difficult to make so as to be comparable at temperatures above and below freezing, and may be replaced by computations based on the wet-bulb temperatures. The absolute amount of evaporation from natural surfaces not protected from wind, rain, sunshine, and radiation, are being made at a few experimental stations and will be discussed in special contributions.

Sensible temperatures.—The sensation of temperature experienced by the human body and ordinarily attributed to the condition of the atmosphere depends not merely on the temperature of the air, but also on its dryness, on the velocity of the wind, and on the suddenness of atmospheric changes, all combined with the physiological condition of the observer. A complete expression for the relation between atmospheric conditions and nervous sensations has not yet been obtained.

PRECIPITATION.

[In inches and hundredths.]

The *distribution of precipitation* for the current month, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III. The total precipitation for the current month was heaviest (from 6 to 18 inches) in the coastal and mountainous regions of northern California, Washington, and Oregon. Areas of 8 to 10 inches were reported from eastern Nebraska, inclosed within a much larger region of over 6 inches.

The larger values at regular stations were: Eureka, 11.1; Astoria, 9.2; Neahbay, 7.9; Greenbay, 7.5.

The *diurnal variation*, as shown by tables of hourly means of the total precipitation, deduced from self-registering gauges kept at the regular stations of the Weather Bureau, is not now tabulated.

The *current departures* from the normal precipitation are given in Table I, which shows that precipitation was in excess over the upper Lake Region, upper Mississippi, and lower Missouri valleys, Manitoba, Washington, Oregon, and northern California. It was deficient in the Atlantic States. The large excesses were: Eureka, 7.0; Dubuque, 5.0; Winnipeg, 4.3; Dodge City, 3.9; La Crosse, 3.6; Greenbay and Astoria, 3.3. The large deficits were: Fort Smith, 4.6; Louisville, 4.2; Vicksburg, 3.6; Palestine, 3.4; Atlanta, 3.1; Nantucket and Hatteras, 3.0.

The *average departure* for each district is also given in Table I. By dividing these by the respective normals the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normals exceed 100):

Above the normal: Lower Lake, 109; upper Lake, 147; North Dakota, 160; upper Mississippi, 130; Missouri Valley, 138; northern Slope, 106; middle Slope, 109; middle Plateau, 145; northern Plateau, 120; north Pacific, 127; middle Pacific, 236.

Normal: Southern Plateau, 100.

Below the normal: New England, 38; middle Atlantic, 37; south Atlantic, 42; Florida Peninsula, 46; east Gulf, 61; west Gulf, 56; Ohio Valley and Tennessee, 57; southern Plateau, (Abilene), 41; southern Pacific, 92.

The years of greatest and least precipitation for April are given in the REVIEW for April, 1890. The precipitation for the current month was the greatest on record at: Williston, 2.86; St. Paul, 5.63; Greenbay, 5.48; La Crosse, 5.84; Minneapolis, 5.12; Huron, 6.17; Sioux City, 6.16; Dubuque, 7.80; Topeka, 4.00; Dodge City, 5.50; Winnemucca, 1.95; Eureka, 11.13; Point Reyes Light, 4.20; Fresno, 2.82. It was the least on record at: Eastport, 0.86; New Haven, 1.19; Nantucket, 0.62; Narragansett Pier, 1.38; Woods Hole, 1.33; Harrisburg, 1.19; Washington, 1.07; Cincinnati, 0.59; Indianapolis, 1.27; Louisville, 0.40; Lexington, 0.40; Wilmington, 0.64; Atlanta, 0.58; Fort Smith, 0.46.

The total accumulated monthly departures from normal precipitation from January 1 to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	*Per ct.*		*Inches.*	*Per ct.*
Lower Lakes	+ 1.00	109	New England	— 2.80	82
North Dakota	+ 2.30	157	Middle Atlantic	— 1.80	85
Northern Slope	+ 0.50	114	South Atlantic	— 3.70	77
Middle Plateau	+ 0.90	116	Florida Peninsula	— 0.60	94
North Pacific	+ 4.40	120	East Gulf	— 4.00	80
Middle Pacific	+ 2.40	114	West Gulf	— 2.50	83
			Ohio Valley and Tenn.	— 5.60	68
			Upper Lakes	— 0.70	92
			Upper Mississippi	— 1.30	86
			Missouri Valley	— 0.50	93
			Middle Slope	— 1.50	73
			Abilene (southern Slope)	— 2.90	54
			Southern Plateau	— 0.40	79
			Northern Plateau	— 1.10	85
			South Pacific	— 1.60	79

Details as to *excessive precipitation* are given in Tables XII and XIII.

The *total monthly snowfall* at each station is given in Table II. Its geographical distribution is shown on Chart VI. The southern limit of freezing temperatures and possible snow is shown on this chart by the isotherm of minimum 32°. The isotherm of minimum 40°, namely, the air temperature within the thermometer shelter, is also given on this chart,

and shows approximately the southern limit of frost on exposed surfaces.

WIND.

The *prevailing winds* for April, 1896, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Abilene, Tex	12	60	sw.	Elpaso, Tex	12	64	sw.
Amarillo, Tex	10	60	s.	Do	27	50	sw.
Do	11	54	s.	Fort Canby, Wash	6	54	s.
Do	28	66	w.	Do	24	58	s.
Buffalo, N. Y	2	54	w.	Do	30	60	s.
Chicago, Ill	10	57	se	Huron, S. Dak	7	51	se.
Do	13	59	s.	Do	25	50	s.
Do	18	60	s.	Moorhead, Minn	28	51	se.
Cleveland, Ohio	2	56	w.	New York, N. Y	4	52	nw.
Do	3	54	w.	Pueblo, Colo	12	54	n.
Denver, Colo	30	50	nw.	Rapid City, S. D	28	58	n.
Dodge City, Kan	12	55	s.	Santa Fe, N. Mex	10	50	sw.
Do	17	54	s.	Sioux City, Iowa	26	50	nw.
Do	28	59	s.	Williston, N. Dak	19	52	w.
Duluth, Minn	1	52	nw.				

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 21, 26, 29. Arizona, 11, 17, 27. Arkansas, 7, 21, 22, 25, 26, 28, 29. California, 6, 9, 10, 13 to 16, 18, 19, 22, 24 to 30. Colorado, 17, 28, 30. Connecticut, 25. Florida, 25. Georgia, 24, 25, 27 Idaho, 6, 7, 8, 10, 12 to 16, 18, 19, 20, 22, 25, 27 to 30. Illinois, 7, 10, 13, 18, 20, 21, 23, 26, 28, 29. Indiana, 8, 20, 21, 24, 27. Iowa, 7, 9 to 13, 19, 20, 23, 25, 26, 28, 29. Kansas, 5 to 8, 10 to 13, 16 to 22, 24, 25, 26, 28, 30. Kentucky, 21, 23, 24, 26, 29. Louisiana, 13, 14. Maryland, 11. Massachusetts, 17, 19, 20. Michigan, 11, 17. Minnesota, 1, 11, 13, 16, 17, 23, 25 to 29. Mississippi, 26, 27, 29. Missouri, 7, 8, 9, 13, 17, 20, 21, 22, 24 to 30. Montana, 13. Nebraska, 5, 7 to 12, 16, 17, 20, 23, 25, 26, 28, 30. Nevada, 6, 15, 16, 17, 19 to 22, 25, 26, 28, 29. New Jersey, 2, 21. New York, 2, 4, 6, 17, 20, 21, 25. North Carolina, 8, 9, 17, 24, 25. North Dakota, 8, 11, 12, 26, 27. Ohio, 1, 11, 20, 21, 24, 27 to 30. Oklahoma, 8. Oregon, 5 to 10, 14, 15, 17, 18, 24, 25, 27 to 30. Pennsylvania, 17, 21. South Carolina, 24, 25. South Dakota, 11, 17, 23, 25, 27. Tennessee, 20, 21, 22, 24, 26, 27, 30. Texas, 1, 2, 3, 8, 11, 12, 13, 21, 22, 28, 30. Utah, 10, 11, 14, 27. Virginia, 9, 17, 24. Washington, 2, 6, 7, 8, 10 to 15, 18, 21, 25, 28, 29. West Virginia, 21, 24, 29, 30.. Wisconsin, 1, 10, 11, 13, 16, 17, 18, 20, 27, 28.

SLEET.

The following are the dates on which sleet fell in the respective States:

Arizona, 11, 27. California, 9, 11, 14, 15, 16. Colorado, 10 to 13, 16, 17, 26. Connecticut, 2. Idaho, 10, 11, 18. Illinois, 6 to 9. Indiana, 8. Iowa, 7, 8, 9. Kentucky, 8. Maine, 2, 7, 22. Maryland, 6, 9. Massachusetts, 2, 22. Michigan, 1, 9, 10, 22. Minnesota, 6, 7, 8, 11, 16, 17. Missouri, 8, 13. Montana, 30. Nebraska, 11, 12, 17. Nevada, 9, 10, 13, 15, 16, 17, 19, 22, 26, 27. New Hampshire, 2. New Jersey, 2, 7, 10. New York, 2. North Carolina, 9. North Dakota, 1, 7, 8, 11, 12, 13, 15, 16, 17. Ohio, 1, 8, 9. Oregon, 9, 12, 18, 24, 29, 30. Pennsylvania, 2 to 9. South Dakota, 6, 7, 10, 11, 17. Texas, 2, 3, 17. Utah, 14, 16, 17. Virginia, 9. Washington, 1, 2, 25. West Virginia, 9. Wisconsin, 1, 2, 7, 9.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 17 regular stations of the Weather Bureau by its photographic, and at 21 by its thermal effects. At one station records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric sheets show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of the clearness of the sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary when the duration of cloudiness is alone desired, as is usually the case.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *durations* of effective sunshine whence the duration relative to possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have no necessary relation to each other, since stationary banks of clouds may obscure the sun without covering the sky, but when all clouds have a steady motion past the sun and are uniformly scattered over the sky, the percentages of duration and of area agree closely. For the sake of comparison, these percentages have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental records of percentages of durations of sunshine are almost always larger than the observers' personal estimates of percentages of area of clear sky; the average excess for April, 1896, is 5 per cent for photographic and 14 per cent for thermometric records. The details are shown in the following table, in which the stations are arranged according to the greatest possible duration of sunshine, and not according to the *observed* duration as heretofore.